Amendments to the Claims

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (currently amended) A semiconductor device composed of one or more insulating or semi-insulating layers, one conducting semiconductor layer, two conducting pads, and a layer of at least one single-stranded DNA probe, characterized in that:

said conducting semiconductor layer is on top of one of said insulating or semi-insulating layers, said two conducting pads are on both sides on top of an upper layer which is either said conducting semiconductor layer or another of said insulating or semi-insulating layers, making electrical contact with said conducting semiconductor layer, and said layer of at least one single-stranded DNA probe is directly adsorbed on the surface of said upper layer, between the two conducting pads,

wherein exposure of said single-stranded DNA probe to a sample containing a target DNA or RNA, under hybridization conditions, causes either a current change resulting from the hybridization process when a constant electric potential is applied between the two conducting pads

(3) or a change in the electric potential required to keep a constant current.

~~for the detection of a target DNA or RNA, said device being composed of:~~

~~(i) at least one layer of a conducting semiconductor;~~

~~(ii) at least one insulating or semi-insulating layer;~~

~~(iii)at least one single stranded DNA probe directly adsorbed on the surface of an upper layer which is either a conducting semiconductor layer (i) or an insulating or semi-insulating layer (ii); and~~

~~(iv) two conducting pads on the upper layer making electrical contact with the conducting semiconductor layer (i), such that electrical current can flow between them at a finite distance from the surface of the device.~~

Claims 2-4 (canceled).

5. (currently amended) A semiconductor device according to ~~Claim 1 or 3~~ claim 1, wherein said conducting semiconductor layer is a semiconductor selected from a III-V and a II-VI material, or mixtures thereof, wherein III, V, II

and VI denote the Periodic Table elements III =Ga, In; V=As, P; II=Cd, Zn; VI=S, Se, Te.

6. (currently amended) A semiconductor device according to ~~Claim 1 or 3~~ claim 1, wherein said conducting semiconductor layer is doped n-GaAs or doped n-(Al,Ga)As.

7. (currently amended) A semiconductor device according to ~~Claim 1 or 3~~ claim 1, wherein the one or more insulating or semi-insulating layers , that may serve as the base for the device, is a dielectric material selected from the group consisting of silicon oxide, silicon nitride and an undoped semiconductor selected from a III-V and a II-VI material, or mixtures thereof, wherein III, V, II and VI denote the Periodic Table elements III =Ga, In; V=As, P; II=Cd, Zn; VI=S, Se, Te.

8. (original) A semiconductor device according to Claim 7, wherein said undoped semiconductor is undoped GaAs or undoped (Al,Ga)As.

9. (currently amended) A semiconductor device according to Claim 6, wherein said conducting semiconductor layer is a layer of doped n-GaAs which is on top of a semi-

insulating layer of (Al,Ga)As which is on top of another semi-insulating layer of GaAs, and on top of said conducting semiconductor doped n-GaAs layer there is a semi-insulating undoped GaAs layer to which is attached said layer of said at least one single-stranded DNA probe.

10. (currently amended) A semiconductor device according to Claim 6, wherein said conducting semiconductor layer is a layer of doped n-(Al,Ga)As which is on top of an insulating layer of undoped GaAs which is on top of a semi-insulating layer of GaAs, on top of said conducting semiconductor doped n-(Al,Ga)As layer there is a semi-insulating undoped (Al,Ga)As layer on top of which there is an upper undoped GaAs semi-insulating layer, and said layer of at least one single-stranded DNA probe is attached to the upper undoped GaAs semi-insulating layer.

11. (currently amended) A semiconductor device according to ~~Claim 1 or 3~~ claim 1, wherein said at least one single-stranded DNA probe comprises a sequence complementary to a sequence of a target DNA or RNA.

12. (original) A semiconductor device according to Claim 11, wherein said at least one single-stranded DNA

probe comprises a sequence complementary to a mutation sequence of a gene responsible for a genetic disease or disorder.

13. (original) A semiconductor device according to Claim 12, comprising two or more single-stranded DNA probes each of said probes comprising a sequence being complementary to a mutation sequence of a gene responsible for a genetic disease or disorder.

14. (currently amended) An array of semiconductor devices according to ~~Claim 1 or 3~~ claim 1, wherein each device in the array carries a different DNA probe.

15. (original) An array of semiconductor devices according to Claim 14, wherein at least one of said devices in the array carries a DNA probe comprising a sequence complementary to a sequence of a target DNA or RNA.

16. (currently amended) An array of semiconductor devices according to Claim 15, wherein at least one of said devices in the array carries a DNA probe comprising a sequence complementary to a mutation sequence of a target gene responsible for a genetic disease or disorder and at least

another of said devices in the array carries a control DNA probe comprising a sequence complementary to the sequence of the normal gene corresponding to said mutation.

17. (currently amended) A method for the detection of a target DNA or RNA which comprises:

(i) exposing the single-stranded DNA probe of at least one semiconductor device according to ~~Claim 1 or 3,~~ claim 1 to a sample containing the target DNA or RNA, under hybridization conditions; and

(ii) monitoring either the current change resulting from the hybridization process when a constant electric potential is applied between the two conducting pads or measuring the change in the electric potential required to keep a constant current.

18. (original) A method according to claim 17, wherein said single-stranded DNA probe comprises a sequence complementary to a sequence of said target DNA or RNA.

19. (previously presented) A method for the detection of a target DNA or RNA which comprises:

(i) exposing the single-stranded DNA probe of an array according to claim 14, to a sample containing the target DNA or RNA, under hybridization conditions; and

(ii) monitoring either the current change resulting from the hybridization process when a constant electric potential is applied between the two conducting pads or measuring the change in the electric potential required to keep a constant current.